T. O. NO. 10-10BC-6

HANDBOOK
OVERHAUL INSTRUCTIONS

GROUND CAMERA

35-MM

MODEL B-2

(BOLSEY)

THIS PUBLICATION REPLACES T. O. NO. 10-10BC-6
DATED 28 FEBRUARY 1950.

PUBLISHED UNDER AUTHORITY OF THE SECRETARY OF THE AIR FORCE

USAFS, Reprint, 9/10/52, 2000S

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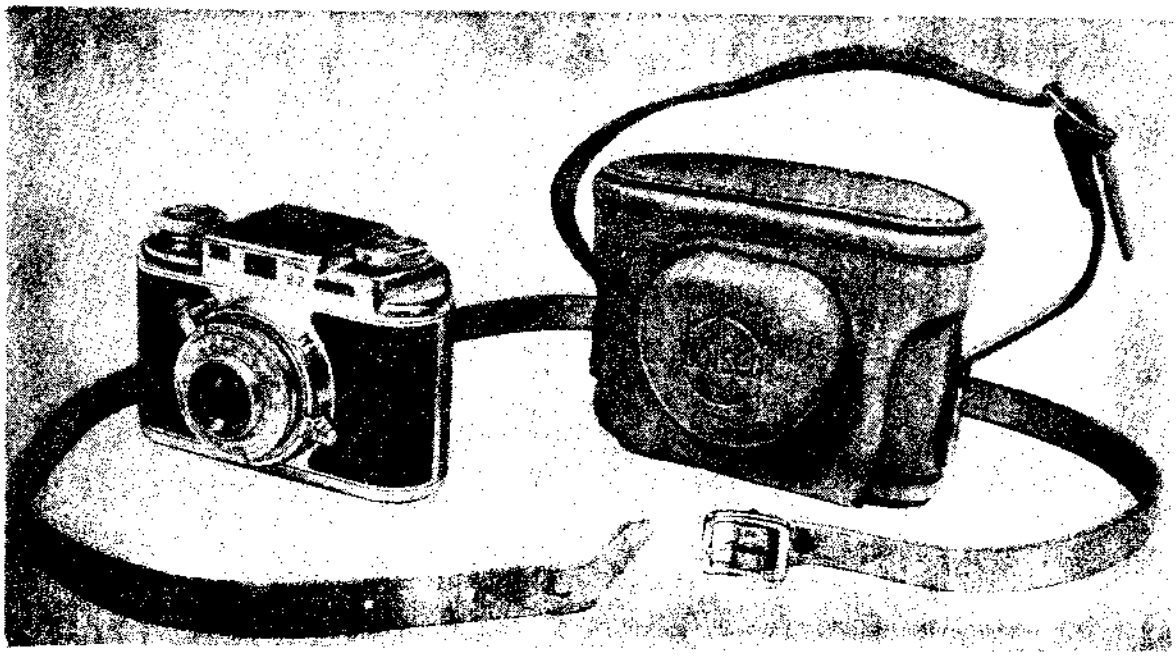


Figure 1-1. Camera, Ground, 35 Millimeter, Bolsey Model B2

SECTION I

INTRODUCTION

1-1. GENERAL.

1-2. This handbook contains instructions for the overhaul of the Camera, Ground, 35 Millimeter, Bolsey Model B2. This instrument is manufactured by the Bolsey Corporation of America, New York, N.Y.

1-3. PURPOSE OF EQUIPMENT.

1-4. Camera, Ground, 35 Millimeter, Bolsey Model B2 is designed for use by Air Force personnel as a general purpose, miniature, portable camera.

1-5. CHARACTERISTICS AND PERFORMANCE.

1-6. For general characteristics and performance data, see figure 1-1 and table I.

TABLE I

CHARACTERISTICS AND PERFORMANCE DATA

FILM	Size Frames	35 millimeter 20 or 36
LENS	Focal length (F) Corrections	44 millimeter Anastigmat, all surfaces coated, color corrected
SHUTTER	Speeds Opening (f) Flash	1/10, 1/25, 1/50, 1/100, 1/200, B,T 3.2, 4, 5.6, 8, 11, 16 Synchronizing wiring internal
RANGE FINDER	Type Range Distance Scale	Internal, coupled, split-image Two feet to infinity 2, 2.6, 3, 4, 5, 6, 8, 12, 24,∞
VIEW FINDER		Internal, Newton type
OTHER		Double exposure prevention Built-in take-up spool Dial type automatic frame counter Depth of field indicator Film in camera indicator Straight-line lens motion in helical mount
MAXIMUM OUTSIDE DIMENSIONS (inches)		4-3/16 long x 2-13/32 wide x 2-13/16 high
WEIGHT	0.934 pounds	
CASE	Material Straps Maximum Outside Dimensions (inches) Weight	Leather Short (12 inches) Long (33 inches) 5 long x 3 wide x 3-9/16 high 1/3 pound
TOTAL WEIGHT OF CAMERA AND CASE		1 pound 3-1/4 oz.

1-7. DESCRIPTION AND OPERATION.

1-8. CASE AND STRAP ASSEMBLY. The case and strap assembly (figure 1-1) is made of leather and is lined on the inside with velvet. The case front assembly (3, figure 4-1) is secured to the case body by means of snap fasteners, three of which are located at the bottom and one at the back of the case body assembly. The case body assembly (1) is secured to the camera assembly by means of the case screw (2) which threads into the camera body through the bottom of the case body assembly. A short strap is riveted to the sides of the case body assembly, and serves as a hand carrying strap. When the long strap assembly (4) is attached to the short strap by means of the buckles, the camera case may be carried on the shoulder. The inside surface of the strap assembly (4) is ruled in 1/16 of an inch to a length of 24 inches, and serves as a means of measuring a distance of two feet from the surface of the lens in order to check the operation of the range finder in case the camera was subjected to a severe shock.

1-9. CAMERA. The camera consists of the following major assemblies: camera body assembly, shutter and lens assembly, range finder assembly, top cover assembly, and back cover assembly. In addition, several smaller assemblies and parts are built into the equipment.

1-10. SHUTTER AND LENS ASSEMBLY. The shutter and lens assembly (75, figure 4-1) consists essentially of the lens, the iris assembly, and the shutter assembly. The lens is an f/3.2, anastigmat, coated, color-corrected lens with a focal length of 44 millimeters. The iris has an opening which may be varied between f/3.2 and f/16. The exposure timing mechanism has speeds from 1/10 to 1/200 of a second, as well as "Time" and "Bulb" positions. In addition, the assembly comprises an electrical switch for synchronized flash bulb exposures. Electrical connections are made through the lead assembly (79), a long screw (50), and a contact spring (49) to a female connector in the top cover assembly. A threaded lock ring (76) secures the shutter and lens assembly to the inner focusing sleeve.

1-11. CAMERA BODY ASSEMBLY. The camera body is an aluminum casting. Outside surfaces are polished and lacquered or covered with coated leatherette. Inside surfaces are black, except where the outer focusing sleeve assembly fits into the body.

1-12. The outer focusing sleeve assembly (74) is a machined aluminum part to which is riveted a focusing arm and focusing knob. The sleeve is grooved on the outside surface. A flat key (71), attached to the camera body by means of a screw (72), extends through a slot in the camera body and secures the outer sleeve assembly to the camera body. At the same time, the key allows the sleeve to turn through a complete circle. The inner focusing sleeve (78) is placed inside the outer focusing sleeve assembly. A guide pin (68) is secured to the inner focusing sleeve by means of a lock washer (70) and nut (69). The guide pin (68) extends through a helical slot in the outer focusing sleeve assembly and a straight slot in the guide plate assembly (66). As the outer focusing sleeve is rotated by means of the focusing knob, the helical slot exerts pressure on the guide pin and causes the inner sleeve and the shutter and lens assembly to move away from or toward the camera. The inner sleeve is prevented from turning by the straight slot in the guide plate assembly. The guide plate is located in the camera body by two dowel pins, and is secured to the camera body by means of two screws (67).

1-13. The rewind shaft (81) extends through a hole in the camera body and a hole in the top cover assembly (26). That part of the rewind shaft which is in the cartridge compartment of the camera body is slotted to fit the film spool in the cartridge.

1-14. The bottom plate assembly (19) is located in the camera body by means of the two dowel pins, and is secured by means of four screws (20). Three holes in the bottom plate assembly serve as bearings for the idler shaft (21), the sprocket assembly (46), and the wind shaft assembly (25). The idler shaft prevents the film from rubbing against the camera body.

1-15. The sprocket assembly (46) consists of a shaft and two sprocket gears. The gears serve as guides for the film. In addition, the sprocket gear teeth cause the sprocket assembly to turn one full turn for each frame. A setscrew (45) secures the gear shaft (44) inside the upper portion of the sprocket assembly. The gear shaft extends through the upper portion of the camera body, and mounts the clutch spring (42), and the gear assembly (41). A spring (39) keeps the gear assembly in position by exerting pressure between the top cover assembly and the gear assembly.

1-16. One end of the clutch spring is bent in the form of a small half-circle which forms a hook that engages or bears against a pin which is part of the gear assembly. When film is being wound on the film spool (23), the sprocket assembly and the gear shaft turn; the clutch spring turns with the gear shaft and engages the pin of the gear assembly, thus causing the gear assembly to turn. This action is positive, since the direction of the turns on the clutch spring causes the spring to tighten around the gear shaft. When the film is rewound by turning the rewind shaft, the pin of the gear assembly bears against the hook of the clutch spring; the resulting pressure causes the spring to release the gear shaft and to allow the sprocket assembly to turn freely. A copper washer (43) prevents wear of the camera body under the clutch spring.

1-17. The gear assembly (41) engages the idler gear assembly (40) which consists of a gear, a hub, and a pin. A stud forced into the camera body forms the shaft of the idler gear assembly. The pin of the idler gear assembly is set in the hub, and is at a right angle to the idler gear stud. A second spring (39), which exerts pressure against the top cover assembly, keeps the idler gear assembly in position.

1-18. When film is wound on the film spool, the gear assembly (41) causes the idler gear assembly (40) to turn clockwise (looking from above). After a complete turn of the sprocket assembly, that is, after a new frame is in position behind the lens, the pin of the idler gear assembly is stopped by the flat spring (47).

This spring is roughly U-shaped, and is attached to the camera body by means of two screws (48). The free end of the spring is bent down at a right angle toward the camera body, and serves as the stop for the pin on the idler gear assembly. At the same time, this stop is shaped so that when the film is being rewound in the cartridge, the idler gear assembly is free to turn with the gear assembly.

1-19. A small tab on the winding stop spring bears against the shoulder of the wind shaft assembly (25). When the wind shaft assembly is lifted a small amount by means of the wind knob (5), the tab on the winding stop spring causes the free end of the spring to lift, and thus allows the idler gear assembly to turn.

1-20. The wind shaft assembly (25) consists of a shaft and a pin. The shaft is located inside the film spool. The pin extends through the wind shaft and engages a slot in the film spool. Thus, when the wind shaft assembly is turned, the film spool also turns. A spring (22) exerts pressure against the lower portion of the film spool and against the bottom plate assembly (19), and thus keeps the spool in a relatively fixed position. Short tabs, which extend in a longitudinal slot in the film spool, secure the film clip (24) to the spool.

1-21. As the gear assembly (41) turns when the wind knob (5) is turned, the pin in the gear assembly engages the free end of the retracting arm assembly (65), and forces the arm to move toward the back of the camera. Further travel by the pin of the gear assembly releases the retracting arm assembly. A helical spring (63) exerts pressure against the retracting pin and returns the retracting arm assembly toward the front of the camera. The retracting arm assembly pivots around a boss on the camera body. A hole in this boss accommodates the rewind shaft. The pin of the retracting arm assembly rests in a slot cut in the plunger (73). The plunger extends to the outside of the camera through a bushing in the camera body. As the shutter release arm moves down at the time a frame is exposed, the retracting arm assembly (65) forces the plunger (73) forward. This prevents the complete return of the shutter release to an operating position until such time as a new frame is wound behind the lens. The plunger thus serves to prevent double exposures. This mechanism operates only when film is properly loaded into camera. In case a double exposure is desired, the shutter release may be returned to operating position by pushing the plunger inward.

1-22. RANGE FINDER ASSEMBLY. The range finder assembly (52) is secured to the top of the camera body by means of two screws (53). Three dowel pins in the base plate assembly (62) locate the range finder assembly on the camera body. Operation of the range finder is based on the relative position of two mirrors. A small mirror is cemented to two tabs on the upper plate. The upper plate assembly (54) is stationary and is secured to the base plate assembly by means of three screws (55) and two neoprene spacers (56 and 57). The mounting screw (55) closest to the mirror is used to adjust the position of the small mirror. The range finder spacer (59) separates the upper and base plates, and allows room for the motion of the range finder arm assembly (61) which is located between the base plate assembly and the upper plate assembly. The range finder arm assembly is spring-loaded by the helical range finder spring (64), and pivots around a dowel pin set in the base plate assembly (62). The large mirror is cemented to two tabs on the long range finder arm. The free end of the range finder arm assembly (61) rests against one end of the range finder short arm (60), which pivots around a dowel pin set in the base plate assembly (62) and is actuated by the guide pin (68). Small adjustments in range finder operation may be made by closing or opening the slot in the range finder short arm (60). A flat spring (58) keeps tension between the upper plate assembly (54) and the range finder arm assembly (61), and is held in place by means of a dimple in the center of the spring. The dimple fits into a hole in the upper plate assembly.

1-23. TOP COVER ASSEMBLY. The top cover body is an aluminum casting. Outside surfaces are polished and lacquered or covered with coated leatherette. Inside surfaces are black. Two screws (27 and 28) attach the top cover assembly to the camera body assembly from inside the body. The name plate is cemented to the top of the top cover body. The exposure counter dial is secured to the top cover body assembly by means of a retaining washer, a bearing washer, a thrust spring washer, and the counter dial gear. One end of the wind shaft assembly (25) extends through the center of the exposure counter dial. The wind knob (5) is secured to the wind shaft assembly (25) by means of two setscrews (6 and 7) which fit in the same hole. The counter dial gear engages the teeth of the idler gear assembly (40). The exposure counter dial is divided in 37 equally spaced graduations, one for each film frame. The gearing is such that the exposure counter dial shows the number of frames which have been exposed.

1-24. Two insulating bushings secure the female connector of the synchronized shutter circuit to the top cover body. The circuit is grounded to the top cover. The inside upper surface of the top cover body is partially covered with an anti-glare shield, as is the upper plate assembly (54) of the range finder. Three openings are cut in the forward side of the top cover body. A mounting bracket (29) is secured to the top cover body by means of a screw (30). The mounting bracket holds a lens (32) and two windows (31 and 33) in place against the openings in the top cover body. The lens (32) is directly opposite the view finder ocular (36) which is held in place by the ocular retainer (37). The range finder ocular (34), a flat glass window, is in line with the small window (31), and is secured by the ocular retainer (35).

1-25. Light from the large window (33) falls on the large mirror of the range finder assembly (52), is reflected to the small mirror, and is again reflected to the range finder ocular. Focusing of the lens is correct when the subject is seen through the range finder ocular as a single image.

1-26. BACK COVER ASSEMBLY. The back cover body is an aluminum casting. Outside surfaces are polished and lacquered, or covered with coated leatherette. The back cover assembly (11) fits against the camera body assembly through a system of grooves and tongues which constitute a light trap. A lock arm,

actuated by a lock shaft and lock lever, engages a tab on the bottom plate assembly (19) and secures the back cover assembly to the camera body assembly.

1-27. Film in the camera is held firmly against the camera body by means of the pressure plate assembly (12). The pressure plate is chrome-plated aluminum. Two rivets secure the plate spring to the pressure plate. The split ends of the plate spring slide under the heads of four rivets secured in the back cover body assembly (18).

1-28. A rivet (13) through the back center of the back cover body assembly holds three concentric dials in place. The depth of field dial (14) and the distance dial (15) combine to form a depth of field calculator. Curves similar to parabolas are shown in white on black on the depth of field dial. At the center of each curve a number is given indicating the "f" opening of the iris in the shutter and lens assembly. The distance dial (15) is engraved in red on white and is graduated in feet, between two feet and infinity. The depth of field dial is fixed, while the distance dial may be turned through a complete circle. For any given "f" opening, objects located between the distances shown on the distance dial and indicated by the ends of the curves on the depth of field dial will be in focus on the film. For example, if the camera is set to f/5.6 and is focused at eight feet, all objects between about six feet and 12 feet will be in focus.

1-29. The film type dial (17), blue on white, turns through a complete circle when actuated by means of the serrations on its edge. The dial is divided into ten sectors which can be read through an opening at the bottom of the depth of field dial (14). Starting with a blank sector, reserved for special types of film, and turning the dial clockwise, the remaining nine sectors read: "Pan X," "Dayl't Anscocolor," "Tungsten Anscocolor," "Dayl't Kodachrome," "Type A Kodachrome," "Ultra Speed Pan," "Super XX," "Supreme," and "Plus X." After the camera is loaded with film, the dial is turned to show the type of film used.

1-30. DIFFERENCES BETWEEN MODELS.

1-31. Several small changes were introduced in the camera during manufacture. Operation of the camera is not affected and, therefore, model designation was not changed. in cameras bearing serial numbers 180,000 and above the following changes were made: shape of exposure counter dial was changed; position of distance scale was shifted to the upper part of the camera body, and a distance pointer was added to the outer sleeve assembly (74, figure 4-1); the shape of the double-exposure preventing plunger (73), was changed; the flat key retaining screw (72) was omitted since the range finder assembly keeps the key in place; the shapes of the bottom plate assembly (19) and of the retaining key (71) were changed; the guide plate assembly (66) was eliminated by changing the camera body assembly, and by adding a stop spacer (81A) and screw (81B); and provisions were made for an additional f-stop (f/22). In addition, camera case is not furnished with cameras bearing serial numbers 180,000 and above. Serial numbers are stamped on the bottom of the back cover assembly (11).

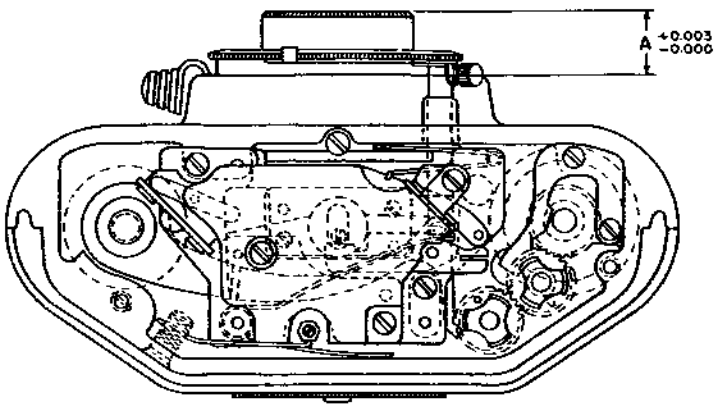
SECTION II

SPECIAL SERVICE TOOLS

2-1. No special service tools are required for the operation or maintenance of this equipment.

SECTION III

TABLE OF LIMITS



ALLOWABLE AXIAL LIMITS (INCHES)

BETWEEN		MAXIMUM	MINIMUM
Shutter and lens assembly	Body assembly	Original +0.003	Original -0.000

Figure 3-1. Table of Limits

NOTE

Axial play of the shutter and lens assembly is the only critical dimension. This play is the result of wear between the guide pin and outer sleeve assembly, and between the flat key and the outer sleeve assembly. Replace the outer sleeve assembly and the flat key if play exceeds that shown in figure 3-1. Excessive wear at other points will become evident as poor operation of the worn part.

SECTION IV

DISASSEMBLY, CLEANING, AND INSPECTION

4-1. DISASSEMBLY. (See figure 4-1.)

a. Remove the camera from the case assembly by releasing the case screw (2), and take out the two setscrews (6 and 7) from the same hole in the wind knob (5), and lift the wind knob from the camera assembly.

b. Take out the two setscrews (9 and 10) from the same hole in the rewind knob (8), and lift the rewind knob from the camera assembly.

c. Remove the back cover assembly (11) by turning the locking lever at the bottom of the back cover assembly in the direction of the arrow and past the position marked "OPEN"; then separate the pressure plate assembly (12) from the back cover assembly (11).

d. Punch out the rivet (13) and separate the depth of field dial (14), the distance dial (15), the spacer (16), and the film type dial (17) from the back cover body assembly (18).

e. Remove four screws (20) and separate the bottom plate assembly (19) from the camera body assembly (82).

f. Remove the idler shaft (21); then lift the spring washer (22) and the film spool (23) from the camera body assembly.

g. Lift all three tabs (small tabs first) of the film clip (24) from the groove in the film spool, and separate the clip from the spool.

h. Push the wind shaft assembly (25) out of the camera body by pressing on the end of the shaft extending through the top cover assembly (26).

i. Remove the two screws (27 and 28) and carefully separate the top cover assembly (26) from the camera body assembly (82).

j. Remove the screw (30) and separate the mounting bracket (29), the range finder small window (31), the view finder lens (32), and the range finder large window (33) from the top cover body assembly (38).

k. With a small thin wooden dowel or rod, push the range finder ocular (34), the ocular retainer (35), the view finder ocular (36), and the ocular retainer (37) from inside the top cover body assembly (38).

l. Lift the two spring washers (39) from the idler gear assembly (40) and the gear assembly (41), and lift the idler gear assembly and the gear assembly from their shafts.

m. Remove the clutch spring (42) from the gear shaft (44), and lift the spacer (43) from the camera body assembly (82); then loosen the setscrew (45) and lift the gear shaft (44) from the sprocket assembly (46).

n. Take out the two screws (48) and lift the winding stop spring (47) from the camera body assembly.

o. Loosen the nut (51), and remove the screw (50) and the contact spring (49) from the insulating bushing.

p. Disengage the range finder helical spring (64) from the range finder arm assembly (61), remove the two screws (53), and separate the range finder assembly (52) from the camera body assembly.

q. Remove the three screws (55) and two neoprene spacers (56 and 57), and separate the upper plate assembly (54), the flat spring (58), the range finder spacer (59), the range finder short arm (60), and the range finder arm assembly (61) from the base plate assembly (62).

r. Disengage the helical spring (63) from the retracting arm assembly (65), and separate the spring from the camera body assembly (82).

s. Remove the range finder helical spring (64) and the retracting arm assembly (65) from the camera body assembly.

t. Take out the two screws (67) and separate the guide plate assembly (66) from the camera body assembly.

u. Loosen the nut (69) and remove the guide pin (68), the nut (69), and the lock washer (70) from the focusing inner sleeve (78).

v. Remove the screw (72), and lift the flat key (71) from the recess in the camera body assembly.

w. Pull the plunger (73) out of the bushing in the camera body assembly and slide the focusing outer sleeve assembly (74) out of the camera body assembly; then slide the focusing inner sleeve (78) from the focusing outer sleeve assembly.

x. By means of a spanner wrench remove the lock ring (76) from inside the focusing inner sleeve (78), and separate the shutter and lens assembly (75) and the shim spacer (77) from the focusing inner sleeve (78).

y. Loosen, but do not remove, the screw on the shutter and lens assembly (75), and separate the lead assembly (79) from the shutter and lens assembly.

z. Remove the snap ring (80) from the rewind shaft (81), and push the rewind shaft out of the camera body assembly (82).

4-2. CLEANING.

4-3. Clean all glass with approved optical tissue.

4-4. Clean all metal parts with a lint-free cloth moistened with carbon tetrachloride or other approved cleaning agent. Keep the cleaning fluid from entering under the edges of the leatherette and the anti-glare shields.

4-5. INSPECTION.

4-6. GLASS. Inspect all glass for scratches, cracks, and chips. If any are found, the damaged glass must be replaced with new.

4-7. SPRINGS AND SPRING WASHERS. Inspect the three spring washers (39 and 22) for cracks and loss of resilience. Replace damaged spring washers with new. Inspect the helical springs (63 and 64), the flat springs (47 and 58), the film clip (24), and the spring of the pressure plate assembly (12) for breaks, corrosion, and bending. Broken or bent springs must be replaced. Corrosion may be removed with an approved polishing cloth. Badly corroded springs must be replaced with new.

4-8. SCREWS AND THREADS. Inspect all screws and all threaded parts and holes for stripped threads. Replace damaged screws with new. Parts with badly damaged threaded holes must be replaced with new.

4-9. BACK COVER ASSEMBLY. Inspect the plate spring of the pressure plate assembly for resilience by placing the assembly on a flat surface, spring down. Press on the plate several times and note whether the plate returns to its original position. When at rest, the spring should form an arc approximately 1/4-inch high.

4-10. Inspect the back cover body for cracks or breakage, especially around the threads provided for the case screw. If any cracks or breakage are found, the back cover body assembly must be replaced with new. Inspect the lock arm and lock lever for free operation, excessive bending, cracks, or breakage. The lock arm inside the back cover assembly should be 1/8 inch above inside of back cover body.

4-11. Inspect the depth of field calculator and film type dials for bends, cracks, and worn lettering. Bent or cracked dials must be replaced with new. Worn lettering may be restored with paint.

4-12. Inspect the leatherette covering for worn and loose places. If badly worn, replace with new; if loose, glue in place as in paragraph 5-4. Inspect the inside of the back cover assembly for worn or chipped paint. Repaint if necessary.

4-13. TOP COVER ASSEMBLY. Inspect the leatherette covering for loose places; if loose, glue in place as in paragraph 5-4. Inspect the inside of the back cover assembly for worn or chipped paint; repaint if necessary. Inspect the exposure counter dial and gear for free movement. Inspect the gear teeth for breaks and excessive wear. Replace the top cover body assembly if the gear teeth are damaged. Inspect the top cover body for cracks, bad dents, and breaks; replace with new if so damaged. Inspect the anti-glare shield for tears or looseness; replace with new, or repair.

4-14. RANGE FINDER ASSEMBLY. Inspect the range finder assembly for loose anti-glare shield, and loose or broken mirrors; glue loose shield and mirrors, or replace the upper plate assembly or the range finder arm assembly if the mirror is broken. Inspect the range finder short arm for bending and for broken adjusting tab; straighten or replace. Inspect the neoprene spacers for breaks and resilience; replace with new if broken or brittle.

4-15. GEAR ASSEMBLIES. Inspect the gear assemblies for damaged teeth and loose pins; replace with new if damaged.

4-16. CAMERA BODY ASSEMBLY. Inspect the leatherette covering for loose places; if loose, glue in place as in paragraph 5-4. Inspect the body for cracks, bad dents, and breaks; replace with new if so damaged. Inspect the body assembly for worn or chipped places; repaint as in paragraph 5-2.

4-17. OUTER FOCUSING SLEEVE ASSEMBLY. Inspect the helical slot in the outer focusing sleeve for small surface discontinuities, dents, or burrs which might impair focusing operation; burrs may be removed; other defects require replacement of sleeve with new part. Inspect all the surfaces of the outer focusing sleeve for scratches; burnish if any are found. Inspect the focusing knob arm for security of mounting; if loose, peen rivets.

4-18. LOCK RING OF SHUTTER AND LENS ASSEMBLY. Inspect the lock ring for cracks or breaks; if defective replace with new part.

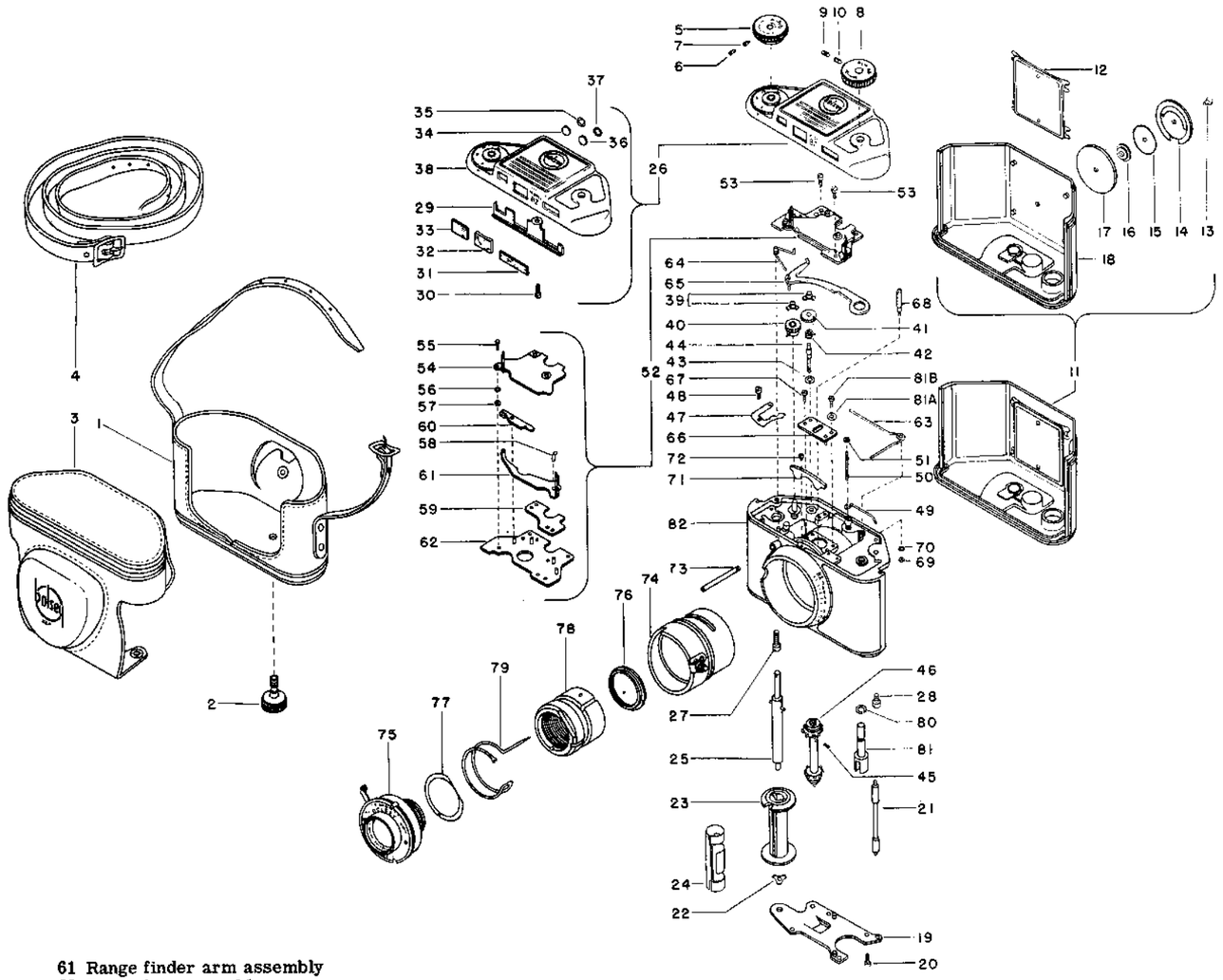
4-19. INNER FOCUSING SLEEVE. Inspect all surfaces for scratches and burrs; burnish or remove. Inspect for cracks and breaks; if defective, replace with new part.

4-20. SHIM SPACER. Inspect the spacer for bends, kinks, and breaks; replace with new if defective.

4-21. LEAD ASSEMBLY. Inspect the lead assembly for broken or cracked insulation, broken wire, and loose solder joint at the terminal; if defective, replace with new.

4-22. SHUTTER AND LENS ASSEMBLY. Inspect the shutter and lens assembly for correct and smooth operation of all controls. Set the shutter speed to "T" and open the shutter. Operate the "f" opening pointer and note smooth change of iris opening between limits. Operate shutter at each indicated speed; a definite difference in speed should be observed, and the shutter should operate smoothly. Inspect the lenses for dirt and scratches; clean as in paragraph 4-3. If any defects are found in the operation of the controls, or if any lens is scratched, replace the entire shutter and lens assembly with new.

4-23. CASE ASSEMBLY. Inspect the case assembly for operation of the snap fasteners, and secure rivets on the strap ends. If broken snap fasteners or rivets are found, the case assembly may have to be replaced with new. Inspect the sewing on the case assembly for broken thread and loose leather; if loose, sew or replace the case assembly.



1 Case body assembly
2 Case screw
3 Case front assembly
4 Strap assembly
5 Wind knob
6 Setscrew
7 Setscrew
8 Rewind knob
9 Setscrew
10 Setscrew
11 Back cover assembly
12 Pressure plate assembly
13 Rivet
14 Depth of field dial
15 Distance dial
16 Spacer
17 Film type dial
18 Back cover body assembly
19 Bottom plate assembly
20 Screw
21 Idler shaft
22 Spring washer
23 Film spool
24 Film clip
25 Wind shaft assembly
26 Top cover assembly
27 Screw
28 Screw
29 Mounting bracket
30 Screw
31 Range finder small window
32 View finder lens
33 Range finder large window
34 Range finder ocular
35 Ocular retainer
36 View finder ocular
37 Ocular retainer
38 Top cover body assembly
39 Spring washer
40 Idler gear assembly
41 Gear assembly
42 Clutch spring
43 Spacer
44 Gear shaft
45 Setscrew
46 Sprocket assembly
47 Winding stop spring
48 Screw
49 Contact spring
50 Screw
51 Nut
52 Range finder assembly
53 Screw
54 Upper plate assembly
55 Screw
56 Neoprene spacer
57 Neoprene spacer
58 Flat spring
59 Range finder spacer
60 Range finder short arm
61 Range finder arm assembly
62 Base plate assembly
63 Helical spring
64 Range finder helical spring
65 Retracting arm assembly
66 Guide plate assembly
67 Screw
68 Guide pin
69 Nut
70 Lock washer
71 Flat key
72 Screw
73 Plunger
74 Focusing outer sleeve assembly
75 Shutter and lens assembly
76 Lock ring
77 Shim spacer
78 Focusing inner sleeve
79 Lead assembly
80 Snap ring
81 Rewind shaft
81A Stop spacer
81B Screw
82 Camera body assembly

Figure 4-1. Exploded View, Camera, Ground, 35 Millimeter, Bolsey Model B2

SECTION V

REPAIR AND REPLACEMENT

5-1. REPAIR.

5-2. PAINTING. Repaint places where the black paint is worn or chipped inside the back cover body assembly, top cover body assembly, and the camera body assembly with lacquer enamel, lusterless, black, NME Specification JAN-L-73. Make sure that the inside of the camera body assembly where the outer focusing sleeve assembly is located is free of lacquer.

5-3. Polished aluminum surfaces, where the lacquer is worn, should be buffed to a high polish and covered with lacquer, clear, AF Specification AN-L-37.

5-4. LEATHERETTE. Glue loose leatherette to the body assembly by means of any approved synthetic rubber cement.

5-5. ANTI-GLARE SHIELD. Glue loose anti-glare shield to top cover body assembly or upper plate assembly by using any approved synthetic rubber cement.

5-6. REPLACEMENT.

5-7. Replacement of worn or damaged parts or assemblies is accomplished by following the applicable portions of the reassembly procedures given in section VI.

SECTION VI

REASSEMBLY

6-1. REASSEMBLY. (See figure 4-1.)

6-2. Insert the terminal of the lead assembly (79) between the insulating washer and the washer on the back of the shutter and lens assembly (75); the wire of the lead assembly must wind toward the shutter release. Secure by tightening the screw.

6-3. Test the operation of the shutter switch and the continuity of the wire by connecting the shutter and lens assembly in a series circuit with a continuity tester, and by operating the shutter release. Make connections to the free end of the lead assembly and to any bare portion on the shutter and lens assembly housing. The tester should indicate continuity when the shutter release is operated. If the tester fails to indicate correct operation of the shutter switch, test the shutter and lens assembly and the lead assembly separately.

6-4. Reassemble the shutter and lens assembly in the camera body as follows:

a. Place the shim spacer (77) over the threads of the shutter and lens assembly (75). The hole in the shim must fit over the small screw.

b. Place the inner focusing sleeve (78) against the shim spacer (77) so that the small slot on the inner flange of the sleeve fits over the small screw on the shutter and lens assembly. The inner focusing sleeve must not touch the screw which secures the lead assembly (79).

c. Place the lock ring (76) inside the inner focusing sleeve and thread the ring over the threads of the shutter and lens assembly. The slotted flange on the ring must face away from the lens.

d. Make one turn with the wire of the lead assembly (79) and bring the wire away from the lens through the slot cut in the narrow shoulder of the inner focusing sleeve (78). Bend the wire away from the terminal, make a turn around the painted outside surface of the inner focusing sleeve, and bring the wire away from the lens through the slot cut in the wide shoulder of the sleeve.

e. With the finger, spread lubricant, Gulf Plastic Petroleum "C," manufactured by the Gulf Oil Co., New York, N.Y., over the outside surface of the outer focusing sleeve assembly (74).

f. Place the outer focusing sleeve assembly (74) inside the camera body assembly (82), and secure with the flat key (71) and screw (72). The screw (72) must not be higher than the edge of the camera body assembly.

g. Spread approved lubricant (see step e. of this paragraph) evenly with the finger over the entire inner surface of the outer focusing sleeve assembly (74).

h. Set the focusing knob to infinity, and insert the inner focusing sleeve (78) inside the outer focusing sleeve assembly (74) so that the soldered end of the lead assembly (79) fits into the insulating bushing located in the rear wall of the camera body assembly (82).

i. Secure the wire in the bushing by means of the headless screw (50).

j. Place the guide pin (68) through the helical slot in the outer focusing sleeve assembly (74) and the hole in the inner focusing sleeve (78); secure the guide pin with the lock washer (70) and nut (69).

k. Place the guide plate assembly (66) over the guide pin (68) and secure to the camera body assembly (82) by means of the two screws (67).

6-5. Test the continuity of the synchronized flash circuit with a continuity tester. Make connections to the headless screw (50) and to any bare point on the

camera body assembly (82). If continuity is not indicated when the shutter is operated, the wire has not been properly inserted into the insulating bushing. If continuity is indicated without operating the shutter, the circuit is shorted to the camera body; trace circuit and replace or adjust to remove short.

6-6. Test the focusing of the shutter and lens assembly as follows:

a. Set the exposure time to "T" and operate shutter release.

b. Set "f" opening to 3.2, and set focusing knob to infinity.

c. Place a ground glass on the film track of the camera body assembly, with the ground side toward the lens.

d. Aim the lens at an object about 300 feet away, and examine the image of the object on the ground glass with a magnifier of 10 power or more. Lines on the image should be sharp and clear.

e. If lines are not clear, move the focusing knob away from the infinity mark until sharp lines are observed.

f. The distance which the lens has moved forward from the body in step e. preceding, is approximately the thickness of the additional shim spacer (77) required in front of the inner focusing sleeve in order to bring the lens in correct focus.

g. If necessary to add shim spacers, remove the screw (50) and disassemble the camera as given in paragraph 4-1, steps t. through x. Then reassemble the camera as given in paragraphs 6-4 through 6-6.

6-7. Reassemble parts in camera body as follows:

a. Place the contact spring (49) over the headless screw (50) so that the free end of the spring points toward the hole which accommodates the rewind shaft (81).

b. Secure the contact spring (49) by means of the nut (51). The spring should run roughly parallel to the back edge of the camera body.

c. Place the winding stop spring (47) in position on the camera body assembly (82), and secure by means of the two screws (48).

d. Slide the clutch spring (42) over the large-diameter shoulder of the gear shaft (44) so that the hook of the spring is away from the small-diameter shoulder of the shaft.

e. Place the spacer (43) under the clutch spring (42) on the gear shaft (44).

f. Place the sprocket assembly (46) in place, and insert the gear shaft (44) through the hole in the camera body and in the hole in the sprocket assembly (46). Secure by means of the setscrew (45), which must bind in the recess cut in the gear shaft (44).

g. Replace the film clip (24) on the film spool (23). Make sure the film clip tongue is on the right when the film spool is held vertically, with the small cutout in the upper flange.

h. Place the wind shaft assembly (25) inside the film spool (23) so that the pin enters the slot in the film spool.

i. Insert the wind shaft assembly (25) through the hole in the camera body assembly (82).

j. Place the idler shaft (21) in its bearing in the camera body assembly. The idler shaft has two shoulders of uneven lengths; the longer shoulder must be closest to the top cover assembly.

k. Place the spring (22) on the end of the film spool (23) shaft assembly so that the three legs of the spring washer rest on the flange of the film spool.

l. Place and fit the bottom plate assembly (19) over the ends of the idler shaft (21), the sprocket assembly (46), and the film spool shaft (23). The tab of the bottom plate assembly (19) must face up and must point towards the idler shaft (21).

m. Position the bottom plate assembly (19) so that the dowel pins fit into the locating holes in the camera body, and secure the bottom plate assembly with four screws (20).

n. Insert the plunger (73) in the bushing of the camera body so that the red dot is covered by the shutter release arm.

o. Place the retracting arm assembly (65) on the camera body assembly (82) so that the pin fits in the slot cut in the plunger (73).

p. Slide the idler gear assembly (40) over the gear shaft, and turn the gear clockwise so that the pin of the idler gear assembly touches the winding stop spring (47).

q. Place the gear assembly (41) on the gear shaft (44). The pin of the gear assembly must face toward the clutch spring (42). Mesh the teeth of the gear assembly (41) and the idler gear assembly (40) so that while the pin of the idler gear assembly is in the position given in preceding step p., an imaginary straight line, drawn through the visible end of the pin of the gear assembly (41) and through the center of the gear shaft (44), is parallel to the axis of the plunger (73).

r. Position the helical spring (63) around the drilled boss of the camera body, and fit the long arm of the spring in the slot cut in the pin of the retracting arm assembly (65). The short arm of the spring must bear against the rear edge of the camera body.

s. Slide the turns of the range finder helical spring (64) over the locating pin. The short arm bent like a hook must face up and toward the guide pin (68).

t. Place a spring washer (39) on the gear assembly (41) so that the three legs of the washer face away from the gear.

u. Place a spring washer (39) on the idler gear assembly (40) so that the three legs of the washer point away from the gear.

6-8. Reassemble the range finder assembly as follows:

a. Place the range finder arm assembly (61), the short range finder arm (60), and the range finder spacer (59) on the base plate assembly (62).

b. Position the upper plate assembly (54) over the range finder spacer (59); thread the attaching screw (55) nearest the large mirror in the base plate for a few turns only.

c. Slide the flat spring (58) under the end of the upper plate assembly (54) nearest the large mirror. The small point in the middle of the spring must fit in a small hole in the upper plate, and the flat spring must be approximately parallel to the large mirror.

d. Slide the narrow end of the range finder arm assembly (61) under the small mirror, and place two neoprene spacers (56 and 57) between the base plate and the upper plate, in line with the screw hole nearest the small mirror. Secure this end of the upper plate assembly by means of a screw (55).

e. Insert the third attaching screw (55) in the free hole in the upper plate assembly (54). Tighten all screws (55), but make sure the range finder arm assembly (61) is free.

6-9. Reassemble the range finder assembly into the camera body as follows:

a. Set the focusing knob to approximately four feet.

b. Press the split end of the short range finder arm (60) towards the small mirror as far as it will go.

c. Holding the short range finder arm, engage the range finder helical spring (64) on the range finder arm assembly (61), and slide the range finder assembly (52) in position.

d. Secure the range finder assembly (52) by means of the two screws (53), and check the free operation of the range finder arm assembly by moving the focusing knob several times from one end of the distance scale to the other.

6-10. Reassemble the top cover assembly as follows:

a. Place the top cover body assembly (38) top down, and position the large range finder window (33), the view finder lens (32), and the small range finder window (31) inside the top cover body assembly and against their respective openings. The flat side of the view finder lens (32) must face out.

b. Secure the two windows and the lens by means of the mounting bracket (29) and screw (30).

c. Place the range finder ocular (34) in the top cover body assembly in the hole nearest the exposure counter dial, and secure by means of the ocular retainer (35).

d. Place the view finder ocular (36) in the top cover body assembly, and secure by means of the ocular retainer (37).

6-11. Secure the top cover assembly to the camera body as follows:

a. Place the top cover assembly (26) in position over the camera body assembly; turn the exposure counter dial to engage the gears.

b. Secure the top cover assembly (26) by means of one screw (28).

6-12. Check the operation of the range finder as follows:

a. Set focusing knob to infinity.

b. On an object 300 feet away from the camera find a straight vertical line, and observe this line through the range finder.

c. Change the setting of the focusing knob, then bring back to infinity; note the position of the moving image.

d. If the moving image is too high, remove the top cover assembly and tighten the screw (55) next to the small mirror.

e. If the moving image is too low, loosen the screw (55) next to the small mirror. If necessary, change the thickness of the neoprene spacers (56 and 57), or add a third spacer to keep the screw firm.

f. If moving image goes past the stationary image when the focusing knob is moved to infinity, close the gap in the short range finder arm (60).

g. If the moving image will not approach and coincide with stationary image when focusing knob is moved to infinity, open the gap in the short range finder arm (60).

h. Replace and secure the top cover assembly as in paragraph 6-11.

6-13. Check the operation of the film winding mechanism as follows:

a. Turn the film spool with the thumb; the spool should turn in either direction with a moderate amount of friction.

b. With the left thumb, turn the sprocket assembly towards the film spool (23); count the number of sprocket teeth which pass any given point before the motion is stopped.

c. Less than nine sprocket teeth should pass the reference point, and the sprocket motion should be stopped by the winding stop spring (47).

d. If the sprocket assembly continues to turn, remove the top cover assembly (26) and the winding stop spring (47), and slightly bend the end of the spring so as to bring the end which stops the motion of the idler gear assembly (40) closer to the camera body. Replace and secure the winding stop spring and the top cover assembly.

e. If the sprocket assembly still continues to turn, observe the motion of the idler gear assembly (40) with the top cover assembly removed. If the winding stop spring (47) does stop the motion of the idler gear assembly, but the sprocket assembly is still free to turn, replace the clutch spring (42) with a new part, and replace the top cover assembly.

f. If the sprocket assembly does not move when turned toward the film spool, push the lower end of the wind shaft assembly while exerting normal pressure on the sprocket shaft. The wind shaft assembly should move up, and the sprocket assembly should be free to make one complete turn.

g. Turn the sprocket assembly towards the film spool until turning motion is stopped.

h. Hold the sprocket assembly in this position, and turn the exposure counter dial so that the zero graduation is opposite the red dot on the top cover assembly.

i. Push the end of the wind shaft assembly as in step f. above, and turn the sprocket assembly; release the end of the wind shaft assembly. Turn the sprocket assembly through 10 complete turns, and note the reading of the exposure counter dial. The red dot should be opposite the "10" mark. If the dial reading does not correspond to the number of complete turns of the sprocket assembly, the dial may be slipping around the dial gear hub; to remedy, remove top cover assembly and stake gear hub to retaining washer located above the dial.

j. Turn both the sprocket assembly and the film spool toward the idler shaft (21). A moderate amount of friction should be present.

6-14. Check the operation of the double-exposure prevention mechanism as follows:

a. Turn the sprocket assembly towards the film spool until the motion is stopped.

b. Lift the wind shaft assembly by pushing on the bottom of the shaft until the idler gear assembly is released, and turn the sprocket assembly for one complete turn.

c. Operate the shutter release, and note the new position of the plunger (73). The plunger should extend out of the bushing and should prevent complete

return of the shutter release arm. If the plunger is not operating, remove the top cover assembly (26) and the range finder assembly (52), and examine the helical spring (63), the retracting arm assembly (65), and the plunger (73) for correct assembly of components and freedom of movement.

6-15. Complete reassembly as follows:

a. Slide the snap ring (80) over the end of the rewind shaft (81) so that the ring rests in the groove cut in the shaft.

b. Insert the rewind shaft (81) in the hole in the camera body and, with a pair of tweezers or other convenient means, close the snap ring (80) around the rewind shaft (81); press the slotted end of the rewind shaft so that the shaft extends through the top cover assembly (26).

c. Secure the rewind knob (8) to the rewind shaft (81) by means of a setscrew (10), and lock with the second setscrew (9).

d. Secure the wind knob (5) to the wind shaft assembly (25) by means of the setscrew (7), and lock with the setscrew (6).

e. Stack the film type dial (17), the spacer (16), the distance dial (15), and the depth of field dial (14) over the hole in the back cover body assembly, and secure to the cover body by means of the rivet (13).

f. Reassemble the pressure plate assembly (12) to the back cover body assembly (18) by sliding the plate spring under the guide rivets.

g. Place the back cover assembly (11) against the camera body, then slide the back cover assembly forward under the top cover assembly. Lock the back cover assembly to the camera body assembly by turning the locking lever away from the lens as far as it will go.

h. Place the camera in the case body (1) of the case and strap assembly, and secure by means of the case screw (2).

i. Secure the case front assembly (3) to the case body assembly (1) by means of the four snap fasteners.

j. If desired, open the short strap on the case body assembly (1), and attach the strap assembly (4) by means of the buckles.

SECTION VII

TEST AFTER OVERHAUL

7-1. GENERAL.

7-2. Testing of the camera after overhaul is best done by actual operation under controlled conditions, and observation of the printed positives. To test in this manner, proceed as given below.

7-3. Load the camera with film of known rating. Remove the back cover assembly, and insert a film cartridge so that the cartridge will engage the slot in the rewind shaft. Pull about three inches of film from the cartridge, and push the end of the film under the entire length of the tongue of the film clip. Align the film over the gate, and engage the perforations in the sprocket teeth. The edge of the film must touch the flange of the film spool. Lift the wind knob slightly, and turn the knob for one complete turn. Replace back cover assembly, and turn wind knob through two complate frames. Set counter dial to zero.

7-4. Secure the camera in a tripod, and set it about eight feet from a suitable subject, preferably a pattern consisting of sharp lines with good contrast. The subject must be illuminated with sufficient light to permit exposure at 1/50 and f/16. Illumination should not change throughout this test.

7-5. Set the "f" opening by means of a calibrated exposure meter, and take a series of exposures at 1/10, 1/25, 1/50, 1/100, and 1/200 of a second

7-6. Set the camera at a distance of about two feet from the subject, and make a series of exposures as in paragraph 7-5; focus by accurately measuring the distance from the surface of the lens to the subject, and setting the focus knob to the distance measured.

7-7. Aim the camera at an object at least 60 feet away from the camera, and take a series of exposures as in paragraph 7-5. Remove the camera from the mounting.

7-8. With the shutter closed, wind four frames of film on the film spool. Keep a bright light directed at the camera, and turn the camera so that the light will touch all surfaces. This is to test for light leakage.

7-9. Rewind the film in the cartridge by turning the rewind knob until the knob is moving with no apparent friction. Remove the back cover assembly, and take the film cartridge from its compartment.

7-10. Develop the film in standard solutions. Enlarge and print all frames. Use glossy paper. All prints should be clear and sharp, except those which were taken at openings other than those read on the exposure meter. If film is fogged, there may be a light leak around the back cover assembly. If prints are consistently out of focus, the lens is not properly focused; see paragraph 6-6.

7-11. If the exposures taken as in paragraph 7-7 are out of focus, the range finder may not be operating properly; see paragraph 6-12.

7-12. Test the continuity of the synchronizing circuit as in paragraph 6-5, except that make connections to the top cover body and to the connector. If an open circuit is indicated, the connector does not touch the contact spring; if a short circuit is indicated, the fault is probably in the contact spring which may be touching the camera body, the range finder assembly, or the top cover body. Disassemble the top cover assembly and correct position of contact spring.

AN 10-10BC-7

PARTS CATALOG

GROUND CAMERA

35-MM

MODEL B-2

(BOLSEY)

THIS PUBLICATION REPLACES AN10-10BC-7 DATED 2 MARCH 1950

PUBLISHED UNDER AUTHORITY OF THE SECRETARY OF THE AIR FORCE
AND THE CHIEF OF THE BUREAU OF AERONAUTICS

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SECTION I

INTRODUCTION

1-1. GENERAL.

1-2. CONTENTS. This Parts Catalog lists and illustrates the parts contained in the Ground Camera, 35 Millimeter, Bolsey Model B2. This instrument is manufactured by the Bolsey Corporation of America, New York, N.Y.

1-3. EXPLANATION OF CONTRACTOR'S PART AND MODEL NUMBERING SYSTEM.

1-4. The contractor's model numbering system indicates the essential characteristics of the instrument. Example:

B 2

Basic Model No. — Variation No.

1-5. The contractor's part numbering system consists of two numbers separated by a hyphen. The first number indicates the project for which the part was originally designed. The second number is the drawing number of the part.

1-6. GROUP ASSEMBLY PARTS LIST.

1-7. GENERAL. Section II, Group Assembly Parts List, consists of a break-down of the complete units into subassemblies and detailed parts. The subassemblies and detailed parts are listed in the order of their disassembly. Attaching parts are listed immediately following the parts which they attach.

1-8. FIGURE AND INDEX NUMBER COLUMN. In this column the digits preceding the hyphen refer to the fig-

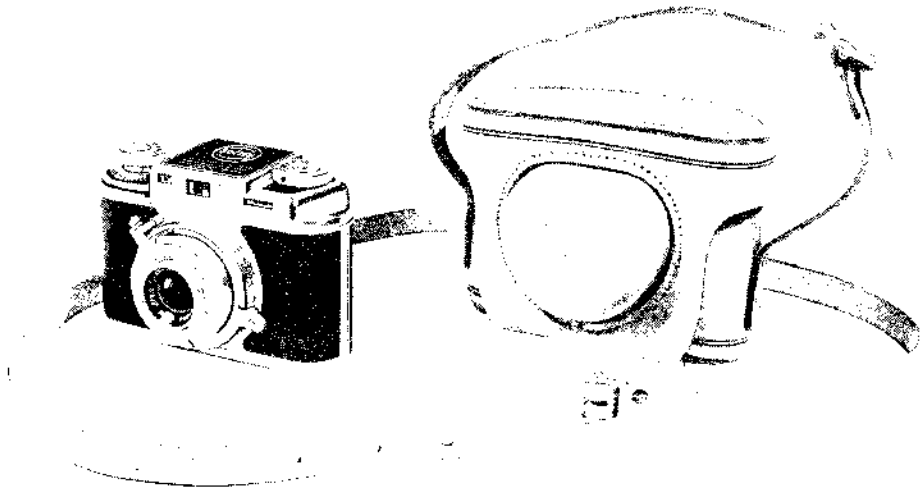

Figure 1. Camera, Ground, 35 Millimeter, Bolsey Model B2

ure in the Parts Catalog on which a part or assembly is illustrated. The digits following the hyphen are the index numbers of parts and assemblies.

1-9. PART NUMBER COLUMN. In this column are listed part numbers for parts and assemblies. (A part number for a nonprocurable part or assembly is marked with an asterisk (*) preceding the part number.)

1-10. NOMENCLATURE COLUMN. In this column is listed each assembly, its attaching parts, and the components of the assembly properly indented to show their relationship to the assembly. The parts are listed in their proper sequence of disassembly, except that attaching parts follow immediately after the item to be attached, precede any components of said item, and are listed in the same column as the parts they attach. (Listing of attaching parts is followed by the symbol----*----in order to distinguish them from subsequent listings of assemblies with the same indention and from detail parts of the next indention to the right.)

1-11. UNITS PER ASSEMBLY COLUMN. In this column is listed the quantity of parts or assemblies required in the immediately preceding assembly of which the part is a component. ("AR" means as required.)

1-12. APPLICATION CODE COLUMN. This Parts Catalog lists only one model of the equipment. However, certain changes were made during production, and these changes are reflected in the listing. Parts and assemblies which are common to all units are indicated by the word "All" in the application code column. Parts which are common to some units but not to all are identified by letters appearing in the application code column. These letters are assigned according to the following code:

Camera Serial No.	Application Code
below 180,000	a
180,000 and above	b

1-13. NUMERICAL PARTS LIST.

1-14. GENERAL. Section III, Numerical Parts List, consists of an alphabetical-numerical arrangement of all assemblies and parts in the Group Assembly Parts List.

1-15. PART NUMBER COLUMN. In this column are listed part numbers for all parts and assemblies listed in the Group Assembly Parts List.

1-16. FIGURE AND INDEX NUMBER COLUMN. In this column the digits preceding the dash refer to the figure in the Parts Catalog on which the part or assembly is illustrated. The digits following the dash are the index numbers of a part or assembly. For Government and contractor standard parts, the figure and index number shown in the Numerical Parts List is the figure and index number for the first occurrence only of such parts in the Group Assembly Parts List Section. Government standard parts are identified by the letters "AN." For nonstandard parts all figure and index numbers are listed.

1-17. TOTAL PER EQUIPMENT COLUMN. In this column is listed the total quantity of parts or assemblies required per unit of equipment.

1-18. USE OF CATALOG.

1-19. WHEN A PART NUMBER IS KNOWN. When a part number is known and it is desired to find the illustration and nomenclature of the part, refer to Section III, Numerical Parts List, which consists of an alphabetical-numerical arrangement of all assemblies and parts in the Group Assembly Parts List. The figure and index number corresponding to the part number refer to Section II, Group Assembly Parts List. The nomenclature corresponding to the desired part number will be found in the Group Assembly Parts List. The part will be illustrated on the figure referred to in the Group Assembly Parts List, and can be located by means of the index number on the illustration. This index number corresponds to the index number on the Group Assembly Parts List.

1-20. WHEN A PART NUMBER IS UNKNOWN. When the part number is not known and it is desired to find the part number and nomenclature, refer to the Table of Contents for the page of the figure on which the desired part is illustrated. Identify the part on the illustration. Refer to its figure and index number on the Group Assembly Parts List for the part number and nomenclature.

1-21. NONPROCURABLE PARTS AND ASSEMBLIES. When a part is nonprocurable and it is desired to know what assembly must be requisitioned, first locate the part in the Group Assembly Parts List. Follow the part up the list until an assembly is obtained which is indented one column to the left of the part in question. Order this assembly when it is necessary to replace the nonprocurable part. If an assembly is listed as nonprocurable, it is necessary to order the component parts of the assembly, if replacement is desired. Refer to the Group Assembly Parts List and order the parts which are listed as components of the assembly.

1-22. SPECIAL SERVICE TOOLS LIST. No special service tools are required to maintain the equipment covered in this catalog.

1-23. SYMBOLS USED.

* Nonprocurable part
AR Quantity as required
----*---- End of listing of attaching parts for part or assembly

1-24. Parts manufactured by vendors (other than Bolsey Corporation of America) are identified by a vendor's code which appears in parentheses in the nomenclature column of the Group Assembly Parts List and immediately following the part name. This code is as follows:

Code	Manufacturer's Name and Address
WOL	Wollensak Optical Co., Rochester, New York

SECTION II

GROUP ASSEMBLY PARTS LIST

CAMERA, GROUND, 35 MILLIMETER, BOLSEY MODEL B2

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6 7	Units Per Assy.	Application Code
2-	214-215	Case and Strap Assembly	1	a
-1	*No number	. Body Assembly - Case	NP	a
		ATTACHING PARTS		
-2	214-219	Screw - Case	1	a
		---------*---------		
-3	*No number	. Front Assembly - Case	NP	a
-4	*No number	. Strap Assembly	NP	a
2-	214-100	Camera, Ground, 35 Millimeter, Bolsey Model B2		a
2-	214-234	Camera, Ground, 35 Millimeter, Bolsey Model B2		b
-5	214-116	. Knob - Wind	1	All
		ATTACHING PARTS		
-6	214-200	. Screw - Set, headless, cone point, blackened steel, No. 3-48, 0.170 inch long	1	All
-7	214-200	. Screw - Set, headless, cone point, blackened steel, No. 3-48, 0.170 inch long	1	All
		---------*---------		
-8	214-113	. Knob - Rewind	1	All
		ATTACHING PARTS		
-9	214-200	. Screw - Set, headless, cone point, blackened steel, No. 3-48,0.170 inch long	1	All
-10	214-200	. Screw - Set, headless, cone point, blackened steel, No. 3-48,0.170 inch long	1	All
		---------*---------		
-11	214-101	. Cover Assembly - Back	1	All
		ATTACHING PARTS		
	*214-178	. Arm - Lock	NP	All
	*214-179	. Lever - Lock	NP	All
	*214-180	. Shaft - Lock	NP	All
		---------*---------		
-12	214-177	. . Plate Assembly - Pressure	1	All
	*214-173	. . . Plate - Pressure	NP	All
	*214-174	. . . Spring - Plate	NP	All
	*214-176	. . . Rivet - Flat head, 60°, brass, nickel plated, 0.063 inch diameter, 0.080 inch long	NP	All
-13	214-165	. . Rivet - Special	1	All
-14	212-119	. . Dial - Depth of field	1	All
-15	212-116	. . Dial - Distance	1	All
-16	212-117	. . Spacer	1	All
-17	212-118	. . Dial - Film type	1	All
-18	214-206	. . Cover Body Assembly - Back	1	All
	*214-170	. . . Cover - Back	NP	All
	*214-171	. . . Covering - Leatherette, back	NP	All
	*214-172	. . . Covering - Leatherette, bottom	NP	All
	*214-175	. . . Rivet - Guide	NP	All
-19	214-136	. Plate Assembly - Bottom	1	a
-19	214-224	. Plate Assembly - Bottom	1	b
		ATTACHING PARTS		
-20	214-196	. Screw - Fillister head, blackened steel, No. 2-56, 0.165 inch long	4	All
		---------*---------		
	*214-135	. . Plate - Bottom	NP	a
	*214-227	. . Plate - Bottom	NP	b

*Nonprocurable part

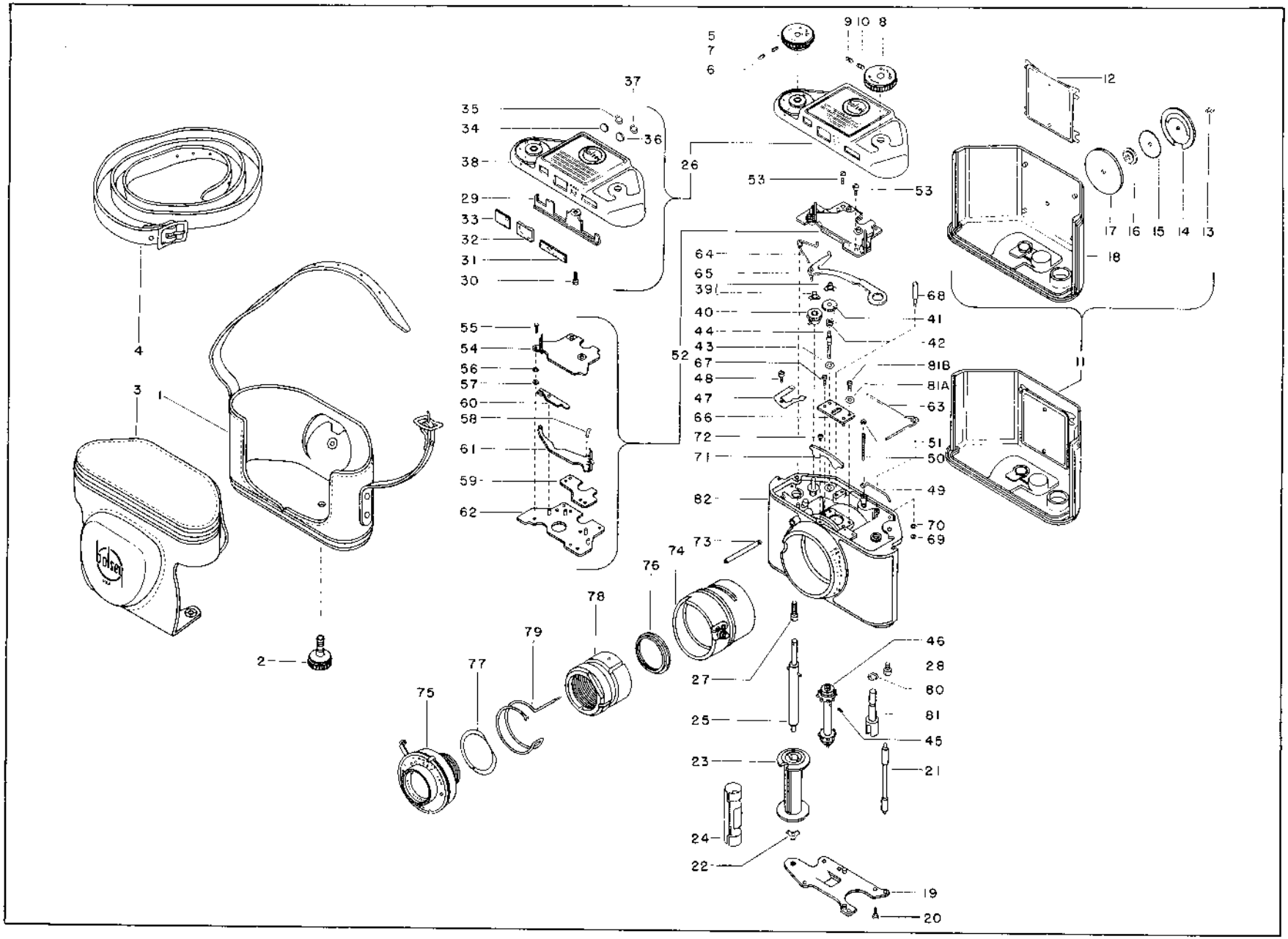

Figure 2. Exploded View, Camera, Ground, 35 Millimeter, Bolsey Model B2

CAMERA, GROUND, 35 MILLIMETER, BOLSEY MODEL B2 (Continued)

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6 7	Units Per Assy.	Application Code
	*214-190	. . Pin - Dowel	NP	All
2-21	214-124	. Shaft - Idler	1	All
-22	214-118	. Washer - Spring	1	All
-23	214-117	. Spool - Film	1	All
-24	214-122	. Clip - Film	1	All
-25	214-207	. Shaft Assembly - Wind	1	All
	*214-119	. . Pin	NP	All
	*214-115	. . Shaft - Wind	NP	All
-26	214-208	. Cover Assembly - Top	1	a
-26	214-231	. Cover Assembly - Top	1	b
		ATTACHING PARTS		
-27	214-198	. Screw - Fillister head, blackened steel, No. 4-40, 0.285 inch long	1	All
-28	214-199	. Screw - Fillister head, blackened steel, No. 4-40, 0.205 inch long	1	All
		---------*---------		
-29	214-103	. . Bracket - Mounting	1	a
-29	214-226	. . Bracket - Mounting	1	b
		ATTACHING PARTS		
-30	214-197	. . Screw - Fillister head, blackened steel, No. 2-56, 0.110 inch long	1	All
		---------*---------		
-31	210-112	. . Window - Range finder, small	1	All
-32	212-87	. . Lens - View finder	1	All
-33	210-111	. . Window - Range finder, large	1	All
-34	212-85	. . Ocular - Range finder	1	All
		ATTACHING PARTS		
-35	214-107	. . Retainer - Ocular	1	All
		---------*---------		
-36	212-86	. . Ocular - View finder	1	All
		ATTACHING PARTS		
-37	214-107	. . Retainer - Ocular	1	All
		---------*---------		
-38	214-209	. . Cover Body Assembly - Top	1	a
-38	214-230	. . Cover Body Assembly - Top	1	b
	*214-169	. . . Body - Top cover	NP	All
	*214-194	. . . Plate - Name	NP	a
	*214-229	. . . Plate - Name	NP	b
	*221-046	. . . Rivet - Name plate	NP	b
	*214-106	. . . Covering - Leatherette	NP	All
	*214-105	. . . Covering - Leatherette	NP	All
	*214-110	. . . Washer - Retaining	NP	All
	*214-120	. . . Washer - Thrust, spring	NP	All
	*214-121	. . . Washer - Bearing	NP	All
	*214-109	. . . Dial - Exposure counter	NP	a
	*223-013	. . . Dial - Exposure counter	NP	b
	*214-108	. . . Gear - Counter dial	NP	All
	*214-102	. . . Shield - Anti-glare	NP	All
	*214-104	. . . Connector - Female	NP	All
	*214-151	. . . Insulator	NP	All
-39	214-130	. Washer - Spring	2	All
-40	214-137	. Gear Assembly - Idler	1	All
	*214-140	. . Gear	NP	All
	*214-138	. . Hub	NP	All
	*214-139	. . Pin	NP	All
-41	214-133	. . Gear Assembly	1	All
	*214-129	. . Gear	NP	All
	*214-132	. . Pin	NP	All
-42	214-134	. Spring - Clutch	1	All
-43	214-142	. Spacer	1	All

*Nonprocurable parts

CAMERA, GROUND, 35 MILLIMETER, BOLSEY MODEL B2 (Continued)

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6 7	Units Per Assy.	Application Code
2-44	214-128	. Shaft - Gear	1	All
		ATTACHING PARTS		
-45	214-131	. Screw - Set, headless, blackened steel, No. 2-56, 0.128 inch long	1	All
		---------*---------		
-46	214-125	. Sprocket Assembly	1	All
	*214-127	. . Gear - Sprocket	NP	All
	*214-126	. . Shaft - Sprocket	NP	All
-47	214-123	. Spring - Winding stop	1	All
		ATTACHING PARTS		
-48	214-197	. Screw - Fillister head, blackened steel, No. 2-56, 0.110 inch long.	2	All
		---------*---------		
-49	214-150	. Spring Contact	1	All
		ATTACHING PARTS		
-50	214-153	. Screw - Headless, blackened brass, No. 3-48, 11/16-inch long	1	All
-51	214-202	. Nut - Hexagonal, blackened brass, No. 3-48, (AN 340-B3 Except for finish)	1	All
		---------*---------		
-52	214-181	. Range Finder Assembly.	1	a
-52	214-233	. Range Finder Assembly.	1	b
		ATTACHING PARTS		
-53	214-196	. Screw - Fillister head, blackened steel, No. 2-56, 0.165 inch long.	2	All
		---------*---------		
-54	214-211	. . Plate Assembly - Upper.	1	All
		ATTACHING PARTS		
-55	214-196	. . Screw - Fillister head, blackened steel, No. 2-56, 0.165 inch long	3	All
-56	214-191	. . Spacer - Neoprene	1	All
-57	214-192	. . Spacer - Neoprene	1	All
		---------*---------		
	*214-183	. . . Plate - Upper	NP	All
	*214-189	. . . Shield - Anti-glare	NP	All
	*210-113	. . . Mirror - Small	NP	All
-58	214-187	. . Spring - Flat	1	All
-59	214-182	. . Spacer - Range finder	1	All
-60	214-186	. . Arm - Range finder, short	1	All
-61	214-210	. . Arm Assembly - Range finder	1	All
	*214-185	. . . Arm - Range finder, long	NP	All
	*210-114	. . . Mirror - Large	NP	All
-62	214-212	. . Plate Assembly - Base	1	a
-62	214-232	. . Plate Assembly - Base	1	b
	*214-184	. . . Plate - Base.	NP	a
	*214-228	. . . Plate - Base.	NP	b
	*214-190	. . . Pin - Dowel	NP	All
-63	214-147	. Spring - Helical	1	All
-64	214-188	. Spring - Helical, range finder	1	All
-65	214-145	. Arm Assembly - Retracting	1	All
	*214-146	. . Arm - Retracting.	NP	All
	*214-148	. . Pin - Retracting	NP	All
-66	214-213	. Plate Assembly - Guide.	1	a
		ATTACHING PARTS		
-67	214-196	. Screw - Fillister head, blackened steel, No. 2-56, 0.165 inch long	2	a
		---------*---------		
	*214-163	. . Plate - Guide	NP	a
	*214-190	. . Pin - Dowel	NP	a
-68	214-161	. Pin - Guide	1	a
-68	221-028	. Pin - Guide	1	b

*Nonprocurable parts

CAMERA, GROUND, 35 MILLIMETER, BOLSEY MODEL B2 (Continued)

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6 7	Units Per Assy.	Application Code
		ATTACHING PARTS		
2-69	214-203	. Nut - Hexagonal, blackened brass, No. 2-56, 0.047 inch thick	1	All
-70	214-201	. Washer - Lock, blackened steel, 3/16 inch OD, 0.012 inch thick for No. 2 screw (AN 936-A2 except for finish)	1	All
		---------*---------		
-71	214-164	. Key - Flat	1	a
-71	214-236	. Key - Flat	1	b
		ATTACHING PARTS		
-72	214-195	. Screw - Fillister head, blackened steel, No. 2-56, 0.075 inch long	1	a
		---------*- -------		
-73	214-149	. Plunger	1	All
-74	214-160	. Sleeve Assembly - Focusing, outer	1	a
-74	214-225	. Sleeve Assembly - Focusing, outer	1	b
	*214-155	. . Sleeve - Outer	NP	a
	*221-006	. . Sleeve - Outer	NP	b
	*214-158	. . Arm - Focusing	NP	All
	*214-157	. . Knob - Focusing	NP	All
	*214-159	. . Rivet - Flat head, 78°, steel cadmium plated, 0.093 inch diameter, 0.084 inch long	NP	All
	*221-005	. . Indicator - Focusing scale	NP	b
	*221-036	. . Rivet - Focusing indicator	NP	b
-75	A9534	. Shutter and Lens Assembly (WOL) (Bolsey Part No. 214-204)	1	All
		ATTACHING PARTS		
-76	6643	. Ring - Lock (WOL) (Bolsey Part No. 214-205)	1	All
-77	214-162	. Spacer - Shim	AR	All
		---------*---------		
-78	214-156	. Sleeve - Focusing, inner	1	All
-79	214-220	. Lead Assembly	1	All
	*214-154	. . Wire - Insulated	NP	All
	*212-125	. . Terminal - Lug	NP	All
-80	214-114	. Ring - Snap	1	All
-81	214-112	. Shaft - Rewind	1	All
-81A	214-237	. Spacer - Stop	1	b
		ATTACHING PARTS		
-81B	214-196	. Screw - Fillister head, blackened steel, No. 2-56, 0.165 inch long	1	b
		---------*---------		
-82	214-214	. Body Assembly - Camera	1	a
-82	214-223	. Body Assembly - Camera	1	b
	*214-168	. . Body - Camera	NP	a
	*214-235	. . Body - Camera	NP	b
	*214-144	. . Bushing - Plunger	NP	All
	*214-141	. . Stud - Idler gear	NP	All
	*214-167	. . Covering - Leatherette, right	NP	All
	*214-166	. . Covering - Leatherette, left	NP	All
	*214-152	. . Bushing - Insulating	NP	All
	*214-193	. . Bushing - Threaded	NP	All
	*214-143	. . Stud - Spring	NP	All

*Nonprocurable part

SECTION III

NUMERICAL PARTS LIST

Part Number	Fig. & Index No.	Total Per Equip.
A9534	2-75	1
210-111	2-33	1
210-112	2-31	1
*210-113	2	NP
*210-114	2	NP
212-116	2-15	1
212-117	2-16	1
212-118	2-17	1
212-119	2-14	1
*212-125	2	NP
212-85	2-34	1
212-86	2-36	1
212-87	2-32	1
214-100	1	
214-101	2-11	1
*214-102	2	NP
214-103	2-29	1
*214-104	2	NP
*214-105	2	NP
*214-106	2	NP
214-107	2-35	2
*214-108	2	NP
*214-109	2	NP
*214-110	2	NP
214-112	2-81	1
214-113	2-8	1
214-114	2-80	1
*214-115	2	NP
214-116	2-5	1
214-117	2-23	1
214-118	2-22	1
*214-119	2	NP
*214-120	2	NP
*214-121	2	NP
214-122	2-24	1
214-123	2-47	1
214-124	2-21	1
214-125	2-46	1
*214-126	2	NP
*214-127	2	NP
214-128	2-44	1
*214-129	2	NP
214-130	2-39	2
214-131	2-45	1
*214-132	2	NP
214-133	2-41	1
214-134	2-42	1
*214-135	2	NP
214-136	2-19	1
214-137	2-40	1
*214-138	2	NP
*214-139	2	NP
*214-140	2	NP
*214-141	2	NP
214-142	2-43	1
*214-143	2	NP
*214-144	2	NP
214-145	2-65	1
*214-146	2	NP
214-147	2-63	1
*214-148	2	NP
214-149	2-73	1
214-150	2-49	1
*214-151	2	NP
*214-152	2	NP
214-153	2-50	1
*214-154	2	NP
*214-155	2	NP
214-156	2-78	1
*214-157	2	NP
*214-158	2	NP
*214-159	2	NP
214-160	2-74	1
214-161	2-68	1
214-162	2-77	AR
*214-163	2	NP
214-164	2-71	1
214-165	2-13	1
*214-166	2	NP
*214-167	2	NP
*214-168	2	NP
*214-169	2	NP
*214-170	2	NP
*214-171	2	NP
*214-172	2	NP
*214-173	2	NP
*214-174	2	NP
*214-175	2	NP
*214-176	2	NP
214-177	2-12	1
*214-178	2	NP
*214-179	2	NP
*214-180	2	NP
214-181	2-52	1
214-182	2-59	1
*214-183	2	NP
*214-184	2	NP
*214-185	2	NP
214-186	2-60	1
214-187	2-58	1
214-188	2-64	1
*214-189	2	NP
*214-190	2	NP
214-191	2-56	1
214-192	2-57	1
*214-193	2	NP
*214-194	2	NP
214-195	2-72	1
214-196	2-20	11
	2-81B	1
214-197	2-30	3
214-198	2-27	1
214-199	2-28	1
214-200	2-6	4
214-201	2-70	1
214-202	2-51	1
214-203	2-69	1
214-204	see A9534	
214-205	see 6643	
214-206	2-18	1
214-207	2-25	1
214-208	2-26	1
214-209	2-38	1
214-210	2-61	1
214-211	2-54	1
214-212	2-62	1
214-213	2-66	1
214-214	2-82	1
214-215	1	
214-219	2-2	1
214-220	2-79	1
6634	2-76	1
214-223	2-82	1
214-224	2-19	1
214-225	2-74	1
214-226	2-29	1
*214-227	2	NP
*214-228	2	NP
*214-229	2	NP
214-230	2-38	1
214-231	2-26	1
214-232	2-62	1
214-233	2-52	1
214-234	1	
*214-235	2	NP
214-236	2-71	1
214-237	2-81A	1
*221-005	2	NP
*221-006	2	NP
221-028	2-68	1
*221-036	2	NP
*221-046	2	NP
*223-013	2	NP

*Nonprocurable part

Part Number	Fig.& Index No.	Total Per Equip.
214-145	2-65	1
*214-146	2	1
214-147	2-63	1
*214-148	2	1
214-149	2-73	1
214-150	2-49	1
*214-151	2	1
*214-152	2	2
214-153	2-50	1
*214-154	2	1
*214-155	2	1
214-156	2-78	1
*214-157	2	1
*214-158	2	1
*214-159	2	3
214-160	2-74	1
214-161	2-68	1
214-162	2-77	AR
*214-163	2	1
214-164	2-71	1
214-165	2-13	1
*214-166	2	1
*214-167	2	1
*214-168	2	1
*214-169	2	1
*214-170	2	1
*214-171	2	1
*214-172	2	1
*214-173	2	1
*214-174	2	1
*214-175	2	4
*214-176	2	2
214-177	2-12	1
*214-178	2	1
*214-179	2	1
*214-180	2	1
214-181	2-52	1
214-182	2-59	1
*214-183	2	1
*214-184	2	1
*214-185	2	1
214-186	2-60	1
214-187	2-58	1
214-188	2-64	1
*214-189	2	1
*214-190	2	13
214-191	2-56	1
214-192	2-57	1
*214-193	2	1
*214-194	2	1
214-195	2-72	1
214-196	2-20	11
214-197	2-30	3
214-198	2-27	1
214-199	2-28	1
214-200	2-6	4
214-201	2-70	1
214-202	2-51	1
214-203	2-69	1
214-204	see A9534	
214-205	see 6643	
214-206	2-18	1
214-207	2-25	1
214-208	2-26	1
214-209	2-38	1
214-210	2-61	1
214-211	2-54	1
214-212	2-62	1
214-213	2-66	1
214-214	2-82	1
214-215	1	
214-219	2-2	1
214-220	2-79	1
6634	2-76	1

* Nonprocurable part